the pass from the foot of the Hispar Pass to the foot of the Biafo glacier is about ninety miles. The mercury on the pass stood at 15·85 in. No one suffered perceptibly from the rarefaction of the air.

THE latest news from Etna is that Monte Gemmellaro has broken out afresh, and the great lava current that has been flowing from it has now been divided into two arms, both of which are rapidly advancing in the direction of Serra Pizzuto and Pedova, completely covering *en route* the lavas of 1886. The deluges of molten rock that have been emitted during the last month have destroyed one of the finest and most fertile districts in Sicily.

PROF. FOREL has recently prepared a table (*Arch. de Sci.* July 15) showing the behaviour of the small lake at the Great St. Bernard in regard to cold since 1817. This lake is at a height of about 8000 feet, is about 24 acres in surface, and of small depth. It appears the mean duration of the frozen state is about 268 days; for nearly two-thirds of the year the lake is imprisoned "under a carapace of ice and snow." This justifies only too well the remark of the monk, "Nine months of winter and three months of bad weather." Between the earliest date of freezing (September 30) and the latest (November 6) are 36 days, the mean date being October 20. The earliest date of thawing is June 12, and the latest September 15; difference 95 days (the mean date being July 13). By grouping the dates in a series of decades (approximately) Prof. Forel finds maxima of duration of the frozen state in 1840–49 and in 1880–91, and a minimum in 1860–69. This corresponds fairly, he points out, with the phases of Brückner's cycle, according to which a maximum of cold occurred about 1850, a maximum of heat about 1860, and a maximum of cold about 1880.

BY the election of the present holder—Mr. A. A. Kanthack—to the Medical Tutorship of the Liverpool University College Medical School, the John Lucas Walker Studentship in Pathology at Cambridge will shortly become vacant. The studentship is of the annual value of £250, and is tenable for three years. Candidates should send in their applications and testimonials by October 25, to Prof. Roy, F.R.S., New Museum, Cambridge.

WE learn from the *British Medical Journal* that the Library of the British Medical Association has been presented with a valuable gift of a series of important works, bearing chiefly on hygiene and public medicine, from the library of the late Dr. Alfred Carpenter. The books number upwards of 250 volumes, and are the gift of Mrs. Carpenter.

AN interesting account of a visit by Mr. E. Satow to the ruins of Sukkhothai and Sawankhalôk, Siam, appears in the Journal of the Society of Arts, for August 12.

A NEW edition—the sixth—of "The Electric Light popularly explained," by A. Bromley Holmes, has just been brought out by Messrs. Bemrose and Sons, Limited.

"PAPERS and Proceedings of the Royal Society of Tasmania for 1891" has just reached us, and we learn from the report that during the year six meetings were held and thirteen papers were read; the income amounted to £393, and the expenditure to £235 1*s.* 1*d.*

A CATALOGUE of Standard English and Foreign Books on Chemistry and the Allied Sciences has just been issued by Mr. W. F. Clay, Edinburgh.

THE Annual Report of the Superintendent, Mr. J. H. Hart, on the Royal Botanic Gardens, Trinidad, for 1891, has lately been published, and much good work seems to have been accomplished during the year.

WE have received from the Australian Museum, Sydney, Parts I. (Cephalopoda) and II. (Pteropoda) of the Catalogue of the Marine Shells of Australia and Tasmania, which Mr. John Brazier is compiling.

A PAMPHLET on "The Dairy and its Equipment, with Practical Management of Milk and Cream," which has been written by Dr. H. J. Webb (the Principal of the Aspatria Agricultural College) in conjunction with Mrs. Edward Moul, and recently issued, is full of information likely to be of use to those engaged in dairy-work.

IN the *American Naturalist* for August, Dr. S. Lockwood gives a geological reason "Why the Mocking Birds Left New Jersey," and the report of Prof. Osborn's lectures on "Heredity and the Germ-Cells" is continued.

Naturae Novitates for July has reached us from the publishers, R. Friedländer & Sohn, Berlin.

THREE new volumes have been added to the excellent series entitled "Encyclopédie Scientifique des Aide-Mémoire" (Gauthier-Villars)—"Notions de Chimie Agricole," by J. Schlœsing, Fils; "Les Divers Types de Moteurs à Vapeur," by E. Sauvage; "La Bière," by L. Lindet.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. H. D. Bowditch; a Puma (*Felis concolor*), a Tayra (*Galictis barbara*) from Brazil, presented by Mr. J. E. Wolfe; three Martineta Tinamous (*Colodromus elegans*) from Bahia Blanca, Argentina, presented by Mr. F. W. Horn; a Slender-billed Cockatoo (*Licmetis tenuirostris*) from Australia, presented by Dr. J. G. Victor Sapp; a Californian Sea Lion (*Otaria stelleri*) from the North Pacific, an Indian Chevrotain (*Tragulus meminna*, ♀) from India, deposited; an Indian Oriole (*Oriolus kundoo*), two —— Himalayan Tree Pies (*Dendrocitta himalayensis*) from India, five Black-necked Tanagers (*Euphonia nigricollis*), six Thick-billed Tanagers (*Euphonia laniirostris*), a Violet Tanager (*Euphonia violacea*), a Greenish Tanager (*Euphonia chlorotica*), a Lead-coloured Tanager (*Hypophœa chalybea*) from Brazil, purchased; a Magellanic Goose (*Bernicla magellanica*) bred in Holland, six Himalayan Tree Pies (*Dendrocitta himalayensis*) from India, received in exchange.

OUR ASTRONOMICAL COLUMN.

THE PERSEIDS.—Mr. Denning, in the August number of *The Observatory*, remarks, with reference to the radiant point of the Perseids, that "the agreement of observation and theory is not perfect, especially as regards the shower at its earlier stages and at its termination, when the displacement appears to be somewhat greater than theory requires." From observations made on August 16, 1877, the radiant he deduced was $60^\circ + 59^\circ$, the theoretical position, according to Dr. Kleiber, being $54^\circ + 59^\circ$. In 1886, on the same date, from the path of a very bright Perseid, Mr. Denning obtained a radiant point of $53^\circ + 59^\circ$, a value closely approaching the theoretical one. As Mr. Denning has reason to believe that the Perseids will continue to fall until the 22nd of this month, and as the suspected radiant for this date is about $77^\circ + 56\frac{1}{2}^\circ$, our readers will have an opportunity of either verifying this position or obtaining one more accurate.

THE observations of the August meteors seem to have been sadly interfered with by the weather. So far we have received no communication respecting them.

"HIMMEL UND ERDE."—The August number of *Himmel und Erde* contains much that will be read with interest. Herr J. Plassmann contributes an article, which will be continued in the next issue, on variable and new stars, in which, after referring to the peculiar features of the late nova, he discusses the light curves of many well-known variables. A supplement to the note on the great February spot includes an illustration

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showing the movement in the line of sight of the F line caused by the presence of a protuberance in the region of the spot. "The Length of our Earth-days," "A Lost Comet," and "Paris Scientific Undertakings" are titles of other communications, the last of which is a brief general survey of recent additions to our knowledge about the construction and movement of the visible universe.

Astronomy at the Columbian Exposition.—Arrangements are about to be made for organizing a series of congresses or conventions to be held next year during the progress of the World's Exposition. The preliminary address of the General Committee on Mathematics and Astronomy points out that such a congress should take advantage of the presence of the leading scholars of the world for the mutual interchange of ideas by presenting and considering investigations in special lines of research.

The sections dealing with Astronomy and Astro-Physics are eight in number and are as follows:—

Astronomy.

a. History of Astronomy.
b. Astronomical Instruments.
c. Methods of Observation.
d. Physical Astronomy.
e. Observatory Buildings.

Astro-Physics.

a. Spectrum Analysis.
b. Astronomical Photography.
c. Stellar Photometry.

The address further states that advice and suggestions with regard to the general conduct of the convention are earnestly invited, while special stress is laid on the scientific questions for future discussion. The Chairmen of the Special Committees of the several subjects under the charge of the General Committee are as follows:—

Pure Mathematics.—Prof. E. H. Moore, Chicago University.
Astronomy.—Prof. G. W. Hough, Dearborn Observatory, North-western University, Evanston.
Astro-Physics.—Prof. George E. Hale, Kenwood Astro-Physical Observatory, Chicago.

Among the names in the partial lists of the Advisory Councils on these two subjects we notice those of Prof. A. Cayley and Prof. J. J. Sylvester for mathematics, and S. Copeland (Astronomer Royal for Scotland), Prof. R. S. Ball, Prof. Gill, Mr. Norman Lockyer, the Earl of Rosse, Prof. Liveing, Prof. Dewar, and Dr. Huggins.

Lunar Eclipse, May 11, 1892.—With reference to the lunar eclipse that occurred last May, *Astronomische Nachrichten* No. 3106 contains a series of accounts, which include the times of immersion and emersion of the objects on the moon's surface, gathered from the following observatories:—Bonn, Heidelberg, Breslau, Christiania, Prag, Kiel, and Kalocsa.

Numeration of Asteroids.—The *Astronomical Journal* No. 271 contains the announcement that an arrangement had been agreed upon by which the numeration of asteroids will in future be put on a sound basis. For the present Prof. Krueger will assign to these bodies the notation 1892 A, B, C...in the order in which their announcement is sent to the Telegraphische Central-Stelle, Prof. Tietzen, Director of the Rechen Institute in Berlin, in the meantime undertaking their definite numeration. This arrangement will be found to avoid all such confusion as has been experienced with regard to those asteroids about which sufficient information is not available for their orbital determinations. Although they will not now receive their numbers, they can easily be recognized by their lettering in the annual series.

THE BRITISH ASSOCIATION.

SECTION C.

Geology.

Opening Address by Prof. C. Lapworth, LL.D., F.R.S., F.G.S., President of the Section.

It has, I believe, been the rule for the man who has been honoured by election to the chair of President of the Geological Section of the British Association to address its members upon the recent advances made in that branch of geology in which he has himself been most immediately interested. It is not my intention upon the present occasion to depart from this time-honoured custom; for it has both the merit of simplicity and the advantage of utility to recommend it. In this way each branch of our science, as it becomes in turn represented, not only submits to the workers in other departments a report of its own progress, but presents by implication a broad sketch of the entire geological landscape, seen through the coloured glasses, it may be, of divisional prejudice, but at any rate instructive and corrective to the workers in other departments, as being taken from what is to them a novel and an unfamiliar point of view.

Now every tyro in geology is well aware of the fact that the very backbone of geological science is constituted by what is known as stratigraphical geology, or the study of the geological formations. These formations, stratified and unstratified, build up all that part of the visible earth-crust which is accessible to the investigator. Their outcropping edges constitute the visible exterior of our globe, the surface of which forms the physical geography of the present day, and their internal characters and inter-relationships afford us our only clues to the physical geographies of bygone ages. Within them lies enshrined all that we may ever hope to discover of the history and the development of the habitable world of the past.

These formations are to the stratigraphical geologist what species are to the biologist, or what the heavenly bodies are to the astronomer. It was the discovery of these formations which first elevated geology to the rank of a science. In the working out of their characters, their relationships, their development, and their origin, geology finds its means, its aims, and its justification. Whatever fresh material our science may yield to man's full conception of nature, organic and inorganic, must of necessity be grouped around these special and peculiar objects of its contemplation.

When the great Werner first taught that our earth-crust was made up of superimposed rock-sheets or formations arranged in determinable order, the value of his conclusions from an economic point of view soon led to their enthusiastic and careful study; and his crude theory of their successive precipitation from a universal chaotic ocean disarmed the suspicions of the many until the facts themselves had gained such a wide acceptance that denial was no longer possible. But when the greater Hutton asserted that each of these rock formations was in reality nothing more nor less than the recemented ruins of an earlier world, the prejudices of mankind at large were loosed at a single stroke. Like Galileo's assertion of the movement of the globe, this demanded such an apparently undignified and improbable mode of creation that there is no wonder that, even down to the present day, there still exist some to whom this is a hard saying, to be taken, if taken at all, in homœopathic doses and with undisguised reluctance.

Hutton, as regards his philosophy, was, as we know, far in advance of his time. With all the boldness of conviction he unflinchingly followed out these ideas to their legitimate results. He claimed that as the stratified formations were composed of similar materials—sands, clays, limestones, and muds—to those now being laid down in the seas around our present coasts, they must, like them, have been the products of ordinary natural agencies—of rain, rivers, and sea waters, internal heat and external cold—acting precisely as they act now. And further as these formations lie one below the other, in apparently endless downward succession, and all are formed more or less of these fragmentary materials, so the present order of natural phenomena must have existed for untold ages. Indeed, to the commencement of this order he frankly admits, "I see no trace of a beginning or sign of an end."

The history of the slow acceptance of Hutton's doctrines, even among geologists, is, of course, perfectly familiar to us all. William Smith reduced the disputed formations to order, and showed that not only was each composed of the ruins of a vanished land, but that each contained in its fossils the proof that it was deposited in a vanished sea inhabited by special life creation. Cuvier followed, and placed it beyond question that the fossilized relics of these departed beings were such as made it absolutely unquestionable that these creatures might well have inhabited the earth at the present day. Lyell completed the cycle by demonstrating stage by stage the efficiency of present natural agencies to do all the work required for the degradation and rebuilding of the formations. Since his day the students of

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